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ABSTRACT

The purpose of this study was to determine the extent of communication between Arizona's secondary schools and postsecondary institutions concerning computer education and computer literacy. A document analysis of college catalogs and a survey of 70 school districts determined the extent of advanced placement courses, computer education services, availability of hardware and software, and computer literacy course offerings (core or elective) available between and among Arizona secondary and postsecondary institutions. It is noted that communication between colleges and high schools could result in the development of new computer education curricula, including classes in programming languages, word processing, data processing, and other literacy courses, that would better prepare high school students for college as well as remove some of the pressure on colleges currently faced with overenrollment in introductory computer courses. Individual chapters report on the purpose of the study, research strategy, method, results, and recommendations. The cover letter, questionnaire, and a list of college course offerings are appended. (26 references) (DB)

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COMPUTER COURSE ARTICULATION AMONG HIGH SCHOOLS AND COLLEGES AND UNIVERSITIES IN THE STATE OF ARIZONA

by

GIFFORD M. BABCOCK

BEST COPY AVAILABLE

A Practicum Report

submitted to the Faculty of the Center for the Advancement of Education at Nova University in partial fulfillment of the requirements for the degree of Master of Science.

The abstract of this report may be placed in a National Database System for reference.

June 1990

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Authorship Statement

I hereby testify that this paper and the work it reports are entirely my own. Where it has been necessary to draw from the work of others, published or unpublished, I have acknowledged such work in accordance with accepted scholarly and editorial practice. I give this testimony freely, out of respect for the scholarship of other workers in the field and in the hope that my work, presented here, will earn similar respect.

Signed _____
Gifford M. Babcock

ABSTRACT

Computer Course Articulation Among High Schools and Colleges and Universities in the State of Arizona.
Babcock, Gifford M., 1990: Practicum Report, Nova University, The Center for the Advancement of Education.
Descriptors: Articulation / Secondary Education / High School / Computer / Computer Programming / Computer Programming Languages / Computer Applications / Computer Data Processing / Computer Science /

The purpose of this study was to determine the extent of articulation between Arizona's secondary schools and post secondary institutions in computer education. A document analysis of post secondary institutional catalogs combined with a survey questionnaire determined the extent of advanced placement and other current computer education services, availability of hardware and software, and course offerings (core or elective) offered between and among Arizona secondary and post secondary institutions.

AUG 27 1990

Nova University
Center For The Advancement of Education
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Practicum Title: COMPUTER COURSE ARTICULATION AMONG HIGH SCHOOLS AND COLLEGES AND UNIVERSITIES IN THE STATE OF ARIZONA.

Student's Name: Gifford M. Babcock

Program Site: Phoenix, Arizona Date: June, 1990

Observer's Name: Loren Felabom Phone #:602/364-7943

Observer's Position: Vice President, Cochise College

Observer's comment on the impact of the project:

_____

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CHAPTER 1

Purpose

The primary objective of this study was to show that current articulation practices in Arizona do not promote the sharing of information among students and institutions. The communication process between Arizona post secondary institutions and secondary schools, limited to the distribution of college catalogs and brochures that outline Associate degree programs and certificate programs in computer science and computer applications, is inadequate in developing effective, challenging courses for students.

To determine the degree of contractual articulation, a questionnaire was sent to 108 public school superintendents throughout Arizona. The purpose was to determine the extent to which high school graduates have been exposed to computer topics taught in the state's colleges and universities. The results will be used to recommend changes in college curricula with the express purpose of making them more attractive to graduating high school students.

Inadequate articulation between secondary and post secondary institutions is not unique to Arizona. This study has been an attempt to determine the extent of

the problem in Arizona.

The need for articulation in computer classes became apparent in 1980, when an estimated 300,000 students were enrolled in introductory computer courses in the nation's colleges and universities. This placed pressure on secondary schools to find ways to help students comprehend the fundamentals of computer programming in high schools and take the pressure off crowded college classrooms (Mace, 1984). Consequently, the question may be asked, "Are Arizona secondary schools reducing the pressure on crowded college classrooms?" In an effort to find an answer, questionnaires were sent to Arizona high school district superintendents to determine whether they were teaching courses that help reduce the pressure on computer classrooms in Arizona's colleges and universities. Upon examination of the catalogs of Arizona colleges and universities, it was evident articulation and advanced placement testing for computer related courses did not exist.

Colleges and universities have offered courses in data processing for more than a decade. For example, in 1976, this researcher was a participant in the development of the curricula at both El Paso Community College and the University of Texas at El Paso. The curricula at these

institutions consisted of an introductory computer course, a systems analysis course, various programming language courses and a computer operations course utilizing a mainframe computer. Poor communications among instructors working with different computers led to overlapping and gaps in the curriculum. In some instances, the same material was taught in courses thought to have been different due to differences in the computers utilized.

Over the last decade, computer education has progressed from large mainframes to microcomputers. Cost considerations prohibited most colleges and universities from investing the hundreds of thousands of dollars needed for a mainframe computer for student use in the 1970's. Today, microcomputers are readily accessible to secondary and post secondary institutions for under two thousand dollars ($2,000.00). This author (currently a Director of Data Processing in an Arizona community college), has observed this transition from mainframe to microcomputer.

The move to microcomputers has changed the emphasis from teaching data processing on large computer systems to teaching applications and programming languages on microcomputers. As microcomputers became popular, the first courses eliminated from the curriculum were

mainframe computer operations courses. It was no longer necessary to teach students how to change bulky disks or tapes because these peripherals are not used on microcomputers as on mainframe computers.

Colleges and universities realize the need to continue teaching programming languages. The microcomputer allows secondary and post secondary institutions the opportunity to advance their computer science programs and general education courses involving computers. Moreover, local school districts offer increasing numbers of courses in computer literacy, word processing, computer assisted drafting, spreadsheets, accounting principals, and other subjects. Microcomputers are assisting elementary and middle school teachers in teaching math, history, reading, writing, spelling, grammar, geography, typing and others.

While secondary school programming courses have increased steadily during the last three to five years, computer science courses have declined in popularity. Initially, a computer science course of study included such courses as introduction to computing, data structures, algorithm design, architecture, and software design. These courses were found to be too difficult for most high school students having an interest in computers.

Today these courses have been replaced with introductory courses in computer literacy, programming languages, and a myriad of application courses.

The programming languages taught include BASIC, LOGO, Pascal, COBOL and RPG. Application courses include word processing, spreadsheets, and databases. Few of the original computer science classes are being offered and those offered are often cut for lack of student interest (Merritt, 1988).

Computer courses have become one of the most popular areas of study on college campuses. The popularity is also having an effect on the high school curriculum. Most high schools find themselves pushing, or being pushed, into designing curricula utilizing computers (Bitter, 1986). Over the next few years, the increasing popularity of computer classes as high school elective courses will provide an increasing proportion of post secondary students with high school computer experience (Greer, 1986).

In the early 1980's, the New Jersey College Board and Educational Testing Services of Princeton, New Jersey, collaborated to develop an Advanced Placement Test in computer science. Later, the College Board appointed the first Advanced Placement Computer Science Development

Committee. This committee drafted a course description using Pascal as the programming language that was the basis for the first Advanced Placement (AP) examination in computer science administered in the state of New Jersey in 1984. The committee also developed a teacher's guide to assist secondary teachers in the planning and teaching of Advanced Placement courses (Bitter, 1986).

When the Advanced Placement course was being designed by the New Jersey College Board, Pascal was selected as the programming language. Although the decision to use Pascal was controversial, the controversy eventually disappeared. The intended purpose of the test (college credit for high school computer courses), is still in question (Bitter, 1986).

The goal of an AP Computer Science course is comparable to courses taught in a first year college or university computer science curricula. That is, it provides incoming students with credit toward a major in computer science. The primary purpose of the AP course is not only to train students in the use of a particular programming language or computing system but also to provide students with a conceptual background in computing and computer science. The primary objective of the AP Computer Science course is to teach students to write

logically structured, well documented computer programs. Although good programmers can write programs in almost any language, certain languages, such as Pascal, encourage good programming habits more than others (Braswell, 1984).

In the spring of 1983 a teacher's guide for the College Board's Advanced Placement course offering in computer science was prepared to assist secondary school teachers in planning and teaching the course. The College Board found that: 1) where courses were currently being taught, the manner of implementation and emphasis at the secondary school and the college levels differed substantially and articulation would likely be very difficult; 2) a diversity of courses described as "Computer Literacy", "Computers and Society" were taught in many different departments; 3) computer-based enhancements promoting computer literacy were incorporated in courses in other disciplines; and 4) it was not clear to the Computer Advisory Task Force how colleges and universities could use, either for admission or placement, information about scores on such an examination (Braswell, 1984).

Ideally an Advanced Placement Computer Science course would be comparable to those of a first-year course offered by college and university computer departments. An

AP course in computer science would cover topics that would normally be covered in six or more semester hours of study in a college-level computer science course (Braswell, 1984).

The computer science department of the University of Texas at Austin developed and offered a teacher training institute for teachers in the Advanced Placement course in high schools. The University of Texas assigned letter grades for credit received by the AP students. A "5" became an "A", a "4" became a "B", a "3" became a "C", etc. While the post secondary academic community attempts to determine what the test accomplishes, high schools continue to pour resources into teaching the preparatory courses (Mace, 1984).

Computer literacy courses serve as an introductory course for students having had no computer experience. More students are entering high school computer literate, ultimately requiring higher level course offerings (Bitter, 1986). As high school computer science programs develop, more content overlap can be expected between high schools and college and university computer science courses (Greer, 1986). Secondary schools reacting to this situation, raise the question, "Why aren't colleges and universities reacting by offering higher level courses in

the freshman and sophomore years?"

Colleges and universities have been slow to react to what freshman have already learned using the microcomputer. This impression is based upon students having had exposure in secondary schools to many courses similar to first-year post secondary computer courses. Due to the lengthy process involved to make curriculum changes, colleges and universities need to be aware of what students are learning in the elementary and secondary levels. Post secondary institutions must respond to student needs and prepare a curriculum that will be attractive and challenging to incoming students; not merely repeat what students had in high school.

Community colleges need to examine their computer course offerings to satisfy educational needs of traditional students coming from high school as well as reentry students. Educators who develop college curricula and secondary curricula in computer science must work together. Necessary changes in the structure and content of the secondary school curriculum to develop appropriate preparatory work in computer science courses can then be coordinated (Merritt,1988).

A study by Susan Merritt (1988) shows a widening gap between the high schools and colleges and universities in

the state of New York. In her article, Ms. Merritt states that "as the understanding and articulation of computer science as a discipline and a science has matured, so has the development of college curriculum in computer science."

The study by Marc Swadener and Karen Jarrett (1986) found computer programming, word processing, and advanced problem solving in regular instruction and content areas the most common courses at the senior high school level. They also found a greater integration in the use of computers in classes other than what may be termed computer oriented classes. Computer oriented classes included programming, computer literacy, and courses on specific applications of computers such as databases, spreadsheets, and/or word processing (Swadener and Jarrett, 1986)

Secondary and post secondary institutions teaching the same courses are subject to specific economic factors. For example, a student interviewed recently stated that he had taken everything in high school that was offered in computer courses at the college he was attending. Recently, an interview with a high school counselor disclosed that his school teaches five courses taught at the local community college. Moreover, if post

secondary institutions offer microcomputer courses without ensuring whether incoming students will benefit, they are neglecting both social and educational obligations. Some duplication is to be expected. However, cooperation between secondary and post secondary institutions would minimize duplication.

Since many colleges and universities are supported by public funds, it is to their benefit to be aware of the politics and economic factors associated with articulation efforts and course offerings. Taxpayers supporting public schools and colleges and universities expect higher levels of learning in post secondary level courses. If colleges and universities are not teaching higher levels of computer utilization and knowledge, the public will surely inform them of their dissatisfaction.

Today's community, technical and junior colleges must meet the needs of all students: young, old, full-time, part-time, working, non-working, as well as day and evening students desiring more education. This decade has witnessed a steady increase in the number of part-time students, who now account for 67 percent of all community, technical, and junior college enrollments. Half of all community college students are older than the traditional 18 to 24 year old. The average age of today's community

college student is approximately 29 years of age.

Associate degree programs, concurrent enrollment opportunities, and other efforts to smooth the flow of students from high schools to community, technical and junior colleges are at work. For example, in California programs are underway to increase the proportion of high school graduates who begin their post secondary studies at community colleges. Moreover, non-traditional students will continue to use community colleges as their stepping stone to new careers (Editorial, 1989)

As mentioned previously, one student had already taken all of the courses offered at the local college while still in high school. Other students face the same problem. They desire additional knowledge in the use of computers but the college or university does not have sufficient course offerings.

Usually, colleges and universities respond to the local demands of business and industry by teaching specific courses. It is common to find credit and non-credit courses designed to answer special needs of local businesses. These courses provide the means whereby a cross section of the community can become conversant in a narrow band of subjects. The institution and the community benefit from a more employable population.

Articulation does not exist in Arizona in the area of computer studies. The communication process between Arizona community colleges and universities and secondary schools is inadequate. Guidelines need to be established that will ensure that computer knowledgeable secondary school graduates will find more sophisticated and challenging computer courses in the post secondary educational environment.

CHAPTER II

Research and Solution Strategy

The research components of this project included a questionnaire, personal interviews, an examination of current catalogs from each of the colleges and universities in the state of Arizona, and a review of the literature. The significant literature is included in the appended Reference List. Other appropriate articles, not referenced, are included in the Bibliography.

The primary purpose of the questionnaire was to determine which topics were taught in secondary schools and the extent of articulation between Arizona's secondary schools and institutions of higher education. The questionnaire contains questions regarding what hardware and software are available to teach the courses; are the courses taught as computer science or computer applications courses; what department is responsible for computer classes; are the computer courses taught as core or elective courses; and, which schools have Advanced Placement Computer Science courses.

Using a questionnaire is regarded as an extremely reliable method of gathering information. In his book, "Statistics, A First Course" John H. Freund devotes an entire chapter to the analysis of count data. A

questionnaire provides count data responses that can determine the relative frequency of specific hardware and software used in Arizona's secondary schools.

Jim Greer (1986) of the University of Texas at Austin conducted a survey of 117 students to investigate the relationship between experience gained through high school computer science courses and achievement in subsequent introductory university computer science courses. Again, this supports the use of the survey as an appropriate instrument for gaining information. Where data proved to be incomplete, interviews were used to gather the missing data.

In Andrew Tellup's (1984) questionnaire to survey the secondary schools in the state of Pennsylvania he investigated the material being taught, the background of teachers, program plans, hardware and software, programming languages, and students receiving computer science instruction. His findings were then used to improve college program planning. The questionnaire used by Tellup was the model for the design of the questionnaire for this study.

The resultant statistical analysis of the questionnaire responses included developing the number and percentage of secondary schools in Arizona teaching

computer topics as listed above.

Marc Swadener and Karen Jarrett's original research contacted 12 schools in preparation for their article on "Computer Use in Content Areas in Secondary Schools." They contacted and interviewed those responsible for the instructional use of computers in five school districts. In this study, seventy school districts were contacted possibly making this study more reliable than that of Swadener and Jarrett.

In addition, telephone and personal interviews were conducted with college and university advisors to obtain information not contained in their respective catalogs. Contacts were asked whether their institution had an Advanced Placement Examination in computer studies. Most stated they did not have such an examination. Northern Arizona University is currently developing one. Interviews with five high school counselors verified that their schools had Advanced Placement Computer Science courses.

Susan M. Merritt (1988) reviewed all the literature available concerning her topic. It was proven that articles provided much usable information for the purpose of this practicum. This is evidenced by the number of articles referenced in the bibliography and reference

lists. This proved to be an excellent source for this study.

Other sources and methods of collecting information included: (1) The Information Retrieval Service (IRS) of Nova University was searched for related literature. Computer education periodicals were examined for articulation topics. (2) The University of Arizona Library research facilities were utilized in the search for pertinent literature. (3) An ERIC search for related literature at Texas Tech University Library was conducted.

The Steenstra and Hogg (1988) study supports the use of college and university catalogs in the search for data. David J. Steenstra and Nancy E. Hogg conducted a statewide study on Computer Information Curricula in the state of Michigan in which they reviewed computer curricula at colleges and universities and conducted interviews with students and employees.

Catalogs were examined from all institutions of higher education in the state of Arizona to determine: (1) which institutions had articulation programs; (2) courses offered at each of the twelve colleges and three universities in the areas of Computer Information Science, Computer Science, and Computer Electronics courses offered at each institution; and (3) information regarding the

presence, or absence of, a College Level Examination Pro gram (CLEP) and an Advanced Placement Examination in computer subjects.

Communication between high schools and institutions of higher education in Florida, South Carolina, Louisiana, Texas, and Pennsylvania have already developed course and articulation guidelines so courses are complimentary. These guidelines helped to standardize computer education, both in applications and programming. An examination of the programs in these states helped to determine the surveys and methods used. All of those named above have examined the problem of articulation in their respective states far beyond the scope of this practicum.

It is hoped that members of the faculty at this author's community college and all other Arizona post secondary institutions will examine the findings of this study and that complimentary curricula will eventually evolve.

CHAPTER III

Method

The searching, investigating, reading, analyzing, coordination, and writing required for this practicum are included, but are not limited to, the following activities in chronological order.

The practicum packet was obtained at the Practicum Orientation Workshop (POW) during May of 1989. Received approval of the workshop facilitators.

A POW practicum advisor was approved and assigned. The topic of the practicum was approved and the necessary paperwork was completed according to the handbook.

During the summer of 1989 I visited Texas Tech University's Library where specifications were submitted for an ERIC search. The first list of literature on articulation was examined. In August 1989, an Information Retrieval Service (IRS) request was submitted to Nova University specifying articles pertaining to the topic - computer course articulation between secondary and post secondary institutions of higher education.

The resultant list included 186 articles, presentations, and publications. A list of abstracts were examined for pertinent literature. Approximately 20 items were selected from the list and requested through the

local college library. Each item was examined for applicability. Only qualified articles were retained for this practicum.

The library at the University of Arizona also proved valuable. That is, several items supporting the practicum topic were discovered there.

The written portion of the practicum began during October 1989. Each chapter was written, reviewed, and rewritten as additional information was discovered. This task lasted until the end of March 1990 when the proposal was finalized and submitted to the practicum advisor. Once approved, it was forwarded to Nova University.

The design of the questionnaire used as the basic data gathering device for this practicum began in early December 1989. The questionnaire development process utilized the format found in the Pennsylvania State University literature (Tellup, 1984). Over the Christmas holidays, the questionnaire and accompanying letter to the district superintendents were finalized and sent to the practicum advisor. Mailing labels were requested and received from the Arizona State Board of Education during this period. The questionnaires and letters were sent to 108 school districts in the state of Arizona. Appendices A and B present the cover letter and the questionnaire.

A request for catalogs from Arizona's colleges and universities took place during December, 1989. Upon receipt, each catalog was examined for information concerning CLEP and Advanced Placement Examinations in computer studies and the number of courses offered in Computer Information Science, Computer Science, and Computer Science Electronics. The findings are summarized in Appendix C.

Completed questionnaires began to arrive within a week after the initial mailing. Of the 108 questionnaires mailed, 73 were returned. Three were returned with a notation that these districts paid to have their students attend another district. Therefore, 70 responses were included in the final analysis.

The returned questionnaires were analyzed by mid April 1990. Tables and charts depicting the findings were not completed until early in May 1990.

The questionnaires provided data on programming languages taught, applications taught, computer science courses taught, hardware used, whether computer skill classes were taught as applications or computer science or both. Moreover, information on departmental responsibility for computer skills education, coordination of the computer education courses, and whether they are taught as

core or elective courses was also gained. A request was made for computer related course instruction for which a student could receive college credit, and whether a course titled Advanced Placement Computer Science course was offered.

The examination of the literature was completed in February 1990, permitting the written portion of the practicum proposal narrative to be completed in March 1990. Upon completion, the narrative portion of the study as well as the appendices, were submitted to the advisor. When the advisor's approval had been received, the proposal was forwarded to the faculty of the Center for the Advancement of Education of Nova University. The completed practicum proposal was mailed early in April 1990.

While Nova University was evaluating the proposal, preparation of the final report began. The revised text for the final report started immediately following the mailing of the proposal.

Interviews with college and university counselors on computer course articulation were conducted in efforts to attain additional information on articulation.

During March 1990, Cochise College sponsored a county-wide meeting of high school counselors. This

meeting provided an additional opportunity to verify information contained on questionnaire responses from nearby school districts.

Continuous review and evaluation allowed for mid-course changes to avoid problems.

CHAPTER IV

Results

The questionnaire was the major source of information for this practicum.

Traditionally, a twenty percent response rate is considered good. Due to the subject matter and selection of those polled, a higher percentage was sought. In those instances where the questionnaire was not returned, no attempt was made to contact the appropriate school district superintendent because the missing questionnaires could not be identified.

The results represent counts and percentages based upon the responses of 70 of Arizona's 105 unified school districts.

Few schools responded to the question concerning the number of students in high school. Likewise, few districts offered a count of the number of computer related courses taught. Judging from the responses, this number ranges from less than ten to more than 100.

The programming languages shown in Figure 1 are based upon 92 class offerings. The business application courses listed most often are shown graphically in Chart 2.

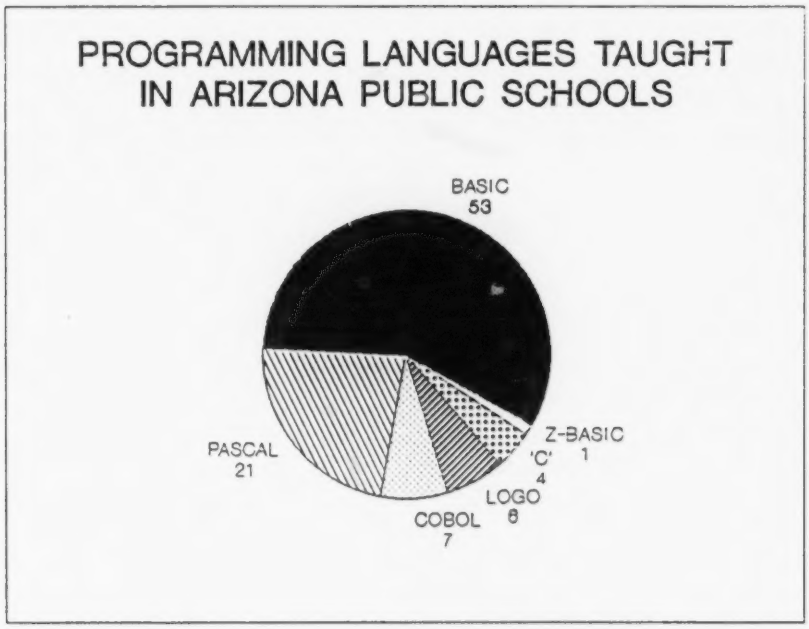

Figure 1

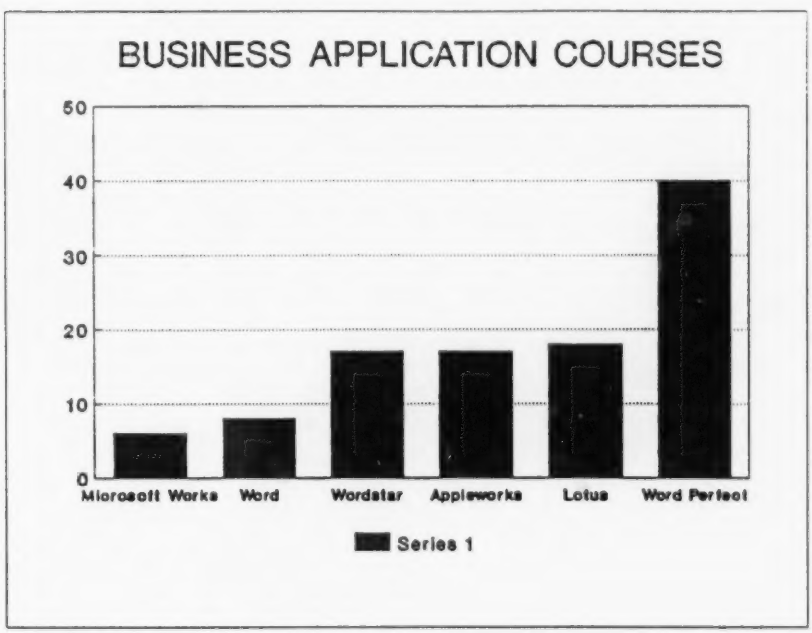

Figure 2

The balance of the 101 offerings include one or two classes of the following:

Microsoft Works	PFS Plan
Hypertalk	PFS File
First Choice	PFS Write
Superpaint	Hypercard
Newsroom	Smart
Word	Display Write III
Excel	MacDraw
Itos Word Processor	MacWrite
Symphony	File II
Leading Edge	Apple Word Perfect
Inventory	Alphawork
Payroll	CYMA

The computer science classes shown in figure 3 are based upon 28 class offerings throughout Arizona, with the majority (13) being operating systems.

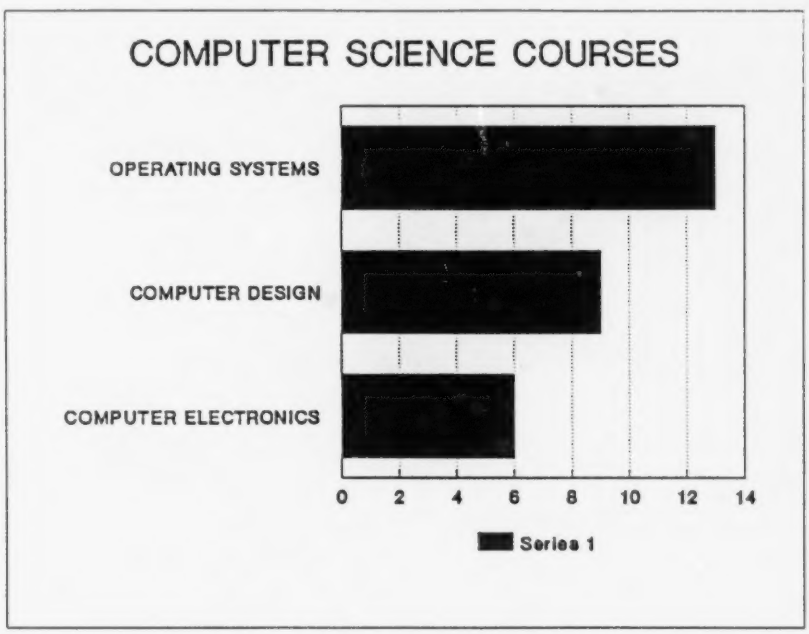

Figure 3

The microcomputers listed are based upon 167 responses. Some districts use microcomputers from two or more vendors. Several districts listed two models of Apple computers or a combination of Apple and Macintosh systems. Figure 4 shows that Apple Corporation products account for 108 responses. That indicates that Apple's share amounts to sixty-five percent of the market in Arizona. The distribution of the major computers are shown Figure 4.

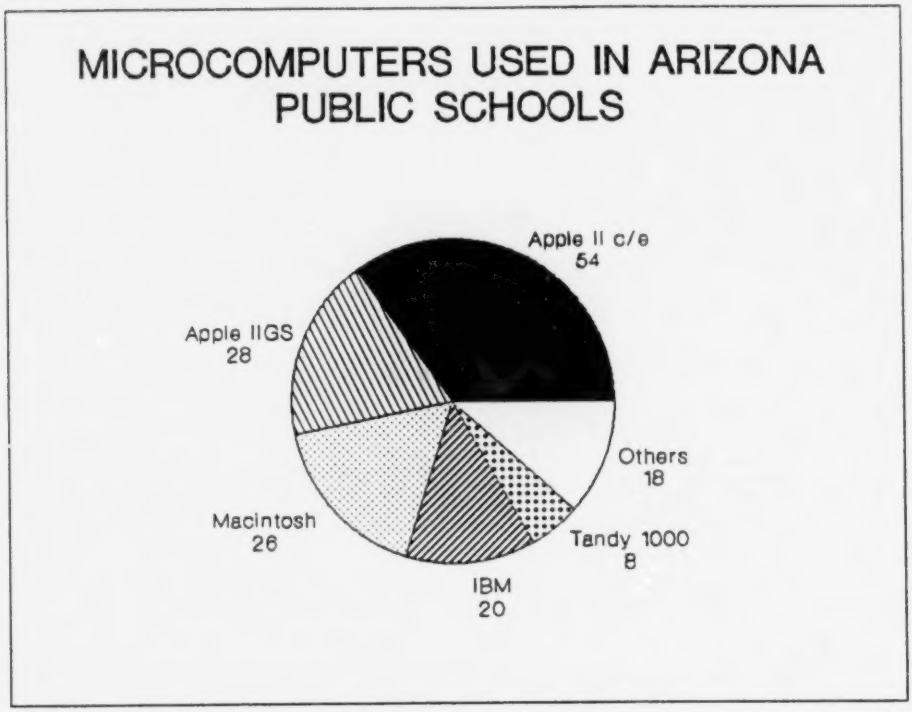

Figure 4

The 18% which makes up the "Other" category consists of the following list of computers.

AT&T	Olivetti
Hyundai	NBI
Amstrad	Star
Laser 128	Packard Bell
Tandy TRS/80	Wang
Northgate	Leading Edge
Microstar	Compaq
Wyse	Fountain
ALR	CAE
NEC	Commodore
Kaypro	Franklin
Imtec	NBI

An interesting note was that one district assembles its own microcomputers.

Computer courses were taught as applications in 31 school districts, for 44%. They were taught as computer science courses in only 5 districts, for 7%. Thirty-two districts teach these courses as both applications and computer science courses, for 46%. One district did not respond to this question while one other district stated they are taught as vocational business courses.

When asked what department is responsible for teaching computer skills, 100 responses indicated some districts have multiple departments sharing this responsibility. The distribution of responsible departments is illustrated in Figure 5.

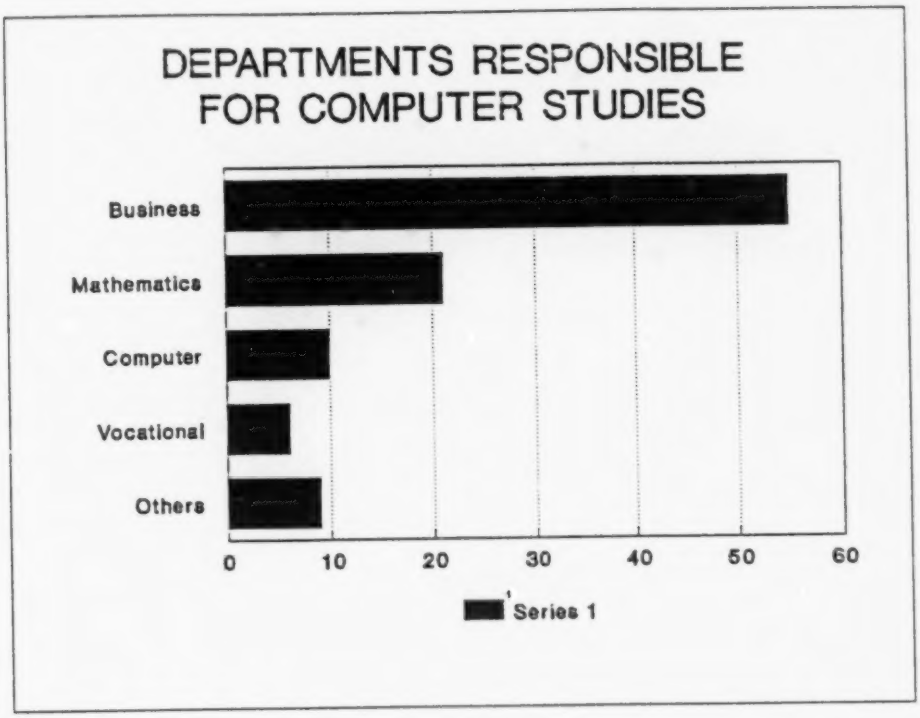

Figure 5

When asked whether there is a computer coordinator in the district, eighteen districts (26%) responded with a 'yes.' Thirty-five districts (50%) stated the high school principals as their coordinator. The balance of the districts did not identify a coordinator.

When asked whether the classes were offered as core or electives, 57 districts (82%) said they are taught as electives. Eight districts (12%) teach them as both. Only one district (2%) teaches them as core courses. Four districts (4%) did not respond.

The courses for which a high school student may receive college credit listed 20 responses. Word processing and computer applications account for four classes each. Pascal and Introduction to Data Processing account for three classes each. Programming, accounting, advanced Basic and computer assisted drafting account for one class each. The remaining fifty respondents did not list any courses.

Very few districts listed colleges granting college credit for high school courses. Those listed include Arizona Western College, Central Arizona College, Cochise College, Glendale, Mohave, Navajo, Northern Pioneer, Pima and Yavapai Colleges.

Only five districts stated they offer the Advanced Placement Computer Science course. All but one of those are large metropolitan districts.

The questionnaire has no right or wrong answers. Therefore, no measurements can be computed against a standard, nor can a "before" and "after" event be calculated. However, these results may become the standard for future studies.

The findings of the college catalog survey are displayed in Appendix C.

CHAPTER V

Recommendations

The first follow-on effort will be to submit the practicum with its findings to the author's college Computer Steering Committee of which the President and his staff are members. A request to reevaluate the college's computer curriculum will be submitted with the practicum. Further, a recommendation will be made for the implementation of both the CLEP and Advanced Placement exams in computer skills.

The surveys, along with a summary of college and university catalogs will be forwarded to all unified school districts and colleges and universities in Arizona with a recommendation that they consider implementing the Advanced Placement curriculum.

Results of this study will be submitted to an education journal for publication.

The entire practicum will be submitted to the Arizona Directors of Information Systems Council (ADISC) for their consideration during their July 1990 meeting.

This study will be forwarded to Vice Presidents of Instruction throughout the state of Arizona with recommendations they revise the curricula at their institution.

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APPENDICES

APPENDIX A

QUESTIONNAIRE COVER LETTER

Gifford M. Babcock
59 Pinal Drive
Bisbee, Az 85603

School District Superintendent
An Arizona Unified School District
P. O. Box 1234
Some City, Az 86000

Dear Superintendent;

I am conducting a survey of Arizona high schools in an attempt to determine the degree to which articulation exists between high schools and the colleges and universities in the state of Arizona, in the area of computer oriented courses.

The data will be used to compile information that is usable by your counselors to advise students who are interested in pursuing a course of study in computer related fields.

If computer oriented courses in your district are the responsibility of a computer coordinator, please forward this request to that individual. If such courses are the responsibility of high school principals, please forward a copy to each principal.

I would appreciate it if all questionnaires for your school district could be returned not later than February 1, 1990. This will enable us to tabulate the results and forward them to you in time to assist you in planning for Fall 1990 class scheduling. A stamped, self addressed envelop is enclosed for your convenience.

Thank you for your assistance in this study.

Sincerely,

Gifford M. Babcock

APPENDIX A

SAMPLE QUESTIONNAIRE

Number of students in the school district _____

Number of students in the school reporting _____

Number of high school courses taught using microcomputers _____

Type of courses taught:

Progamming languages COBOL __ Pascal __ Basic __
C __ LOGO __ LISP __ Other _____

Business applications Word processing; Wordstar __
Multimate __ Advantage __ Word __ Word Perfect __
Lotus 123 __ Quattro __ Generic spreadsheet __
dBASE __ Other _____

Computer science courses Computer design _____
Computer electronics ____ Operating systems _____

Microcomputers used:

Apple IIc/e __ Apple IIgs __ Macintosh __

IBM __ Amiga __ Clone __ Clone name _____

Are the computer courses taught under computer applications or as computer science courses? _____

What department is responsible for teaching computer courses within your district/high school? _____

Is there a computer instruction coordinator in your system to coordinate computer instruction in the high schools or are the high school principals responsible for the computer courses taught in their respective schools? _____

Are computer courses offered as core courses or electives? _____

List all computer related courses for which a student might receive college credit.

_____ _____ _____

Which college(s) _____

Do you have an Advanced Placement Computer Science course? _____

APPENDIX C

LISTING BY NUMBER OF COMPUTER COURSE OFFERINGS IN ARIZONA COLLEGES AND UNIVERSITIES

LISTING BY NUMBER OF COMPUTER COURSE OFFERINGS IN
ARIZONA COLLEGES AND UNIVERSITIES (1990)

COLLEGE NAME	LOCATION	CATALOG YEAR	CLEP EXAM	AP EXAM	CIS	CIS CORE	CS	CS CORE	C/E	C/E CORE
ARIZONA WESTERN COLL	YUMA	1899	YES	YES	21	4	21	0	0	0
CENTRAL ARIZONA COLL	COOLIDGE	1989-90	NO	NO	21	16	0	0	0	0
COCHISE COLLEGE	DOUGLAS	1989-90	NO	NO	40	9	40	11	0	0
EASTERN ARIZONA COLL	THATCHER	1989-90	YES	NO	35	10	35	9	0	0
MESA COMMUNITY COLL	MESA	1989-90	YES	YES	24	11	4	0	0	0
MOHAVE COMMUNITY COLL	KINGMAN	1989-91	YES	NO	13	13	0	0	0	0
NORTHLAND PIONEER	HOLBROOK	1990-91	NO	NO	0	0	17	0	0	0
PARADISE VALLEY CC	PARADISE VL	1989-90	NO	NO	7	?	1	?	0	0
PIMA COMMUNITY COLL	TUCSON	1989-90	NO	NO	71	12	71	20	0	0
SCOTTSDALE COMM COLL	SCOTTSDALE	1989-90	NO	NO	20	10	3	9	0	0
SOUTH MOUNTAIN CC	PHOENIX	1989-90	NO	NO	21	11	21	11	0	0
YAVAPAI COMMUNITY	PRESCOTT	1989-90	YES	YES	23	6	0	0	0	0
ARIZONA STATE UNIV	PHOENIX	1989-90	YES	YES	20	10	41	14	41	20
NORTHERN ARIZ UNIV	FLAGSTAFF	1989-91	NO	NO	22	5	26	33	26	33
UNIV OF ARIZONA	TUCSON	1989-91	YES	NO	27	0	22	12	0	0